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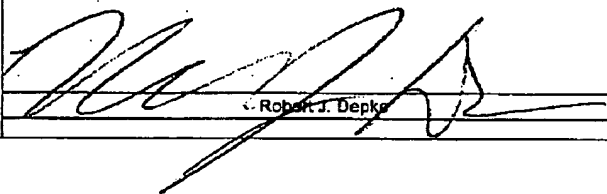
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**NOTES:**

Inventor: Takahiro Arakida et al.  
Serial No.: 10/541,088  
Art Unit: 2883  
Filed: June 29, 2005  
Attorney Ref.: 075834.00455

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**FEE TRANSMITTAL  
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Effective 10/01/2004, Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 500.00)

**Complete if Known**

Application Number	10/541,088
Filing Date	June 29, 2005
First Named Inventor	Takahiro Arakida
Examiner Name	Jerry M. Blevins
Art Unit	2383
Attorney Docket No.	075834.00455

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Rockey, Depke, Lyons et al.

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Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 790	2001 395	Utility filing fee	
1002 350	2002 175	Design filing fee	
1003 550	2003 275	Plant filing fee	
1004 790	2004 395	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1)			(\$ 0.00)

**2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE**

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 86	2201 44	Independent claims in excess of 3
1203 300	2203 150	Multiple dependent claim, if not paid
1204 86	2204 44	** Reissue independent: claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$ 0.00)

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**FEE CALCULATION (continued)****3. ADDITIONAL FEES**

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 60	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 430	2252 215	Extension for reply within second month	
1253 980	2253 490	Extension for reply within third month	
1254 1,530	2254 765	Extension for reply within fourth month	
1255 2,080	2255 1,040	Extension for reply within fifth month	
1401 340	2401 170	Notice of Appeal	
1402 340	2402 170	Filing a brief in support of an appeal	\$500.00
1403 300	2403 150	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,370	2501 685	Utility issue fee (or reissue)	
1502 490	2502 245	Design issue fee	
1503 660	2503 330	Plant issue fee	
1430 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 160	1806 160	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 790	2809 395	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 790	2810 395	For each additional invention to be examined (37 CFR 1.129(b))	
1801 790	2801 395	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

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SUBTOTAL (3) (\$ 500.00)

**SUBMITTED BY**

Name (Print/Type)	Robert J. Depke
Signature	

Registration No. (Attorney/Agent)	37,607
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(Complete if applicable)

Telephone 312-277-2006

Date 12/18/06

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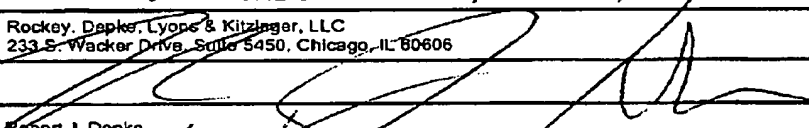
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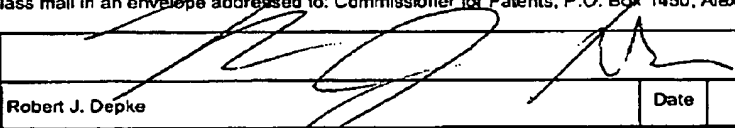
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<b>TRANSMITTAL FORM</b>  (to be used for all correspondence after initial filing)	Application Number	10/541,068
	Filing Date	June 29, 2005
	First Named Inventor	Takahiro Arakida et al.
	Art Unit	2883
	Examiner Name	Jerry M. Blevins
	Attorney Docket Number	075834.0C455
Total Number of Pages in This Submission		

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Firm Name	Rockey, Depke, Lyons & Kitzinger, LLC 233 E. Wacker Drive, Suite 5450, Chicago, IL 60606	
Signature		
Printed name	Robert J. Depke	
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Appl. No.:** 10/541,088 **Confirmation No.:** 4114  
**Applicant:** Arakida et al.  
**Filed:** June 29, 2005  
**TC/A.U.:** 2883  
**Examiner:** Jerry M. Blevins  
**Docket No.:** 075834.00455  
**Customer No.:** 33448

**APPEAL BRIEF**

**I. REAL PARTY IN INTEREST**

The real party in interest is Sony Corporation as a result of transfer of all right, title and interest to the subject matter of this Application Serial No. 10/541,088, via the Assignment recorded in the Patent Office in Reel 017384 Frame 0394 on June 29, 2005.

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**II. RELATED APPEALS AND INTERFERENCES**

Applicants and the undersigned are unaware of any further related judicial proceedings, appeals, or interferences in relation to the instant Appeal.

**III. STATUS OF CLAIMS**

The claims currently stand in condition as modified by the Amendment of April 28, 2006, amending claims 1, 2, 4, and 5, canceling claims 3 and 6, and adding new claim 7.

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01 FC:1402 500.00 DA

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Accordingly, claims 1, 2, 4, 5, and 7 are currently rejected and appealed, and stand in condition as set forth in the attached Appendix of Claims on Appeal.

#### **IV. STATUS OF AMENDMENTS**

No Amendment After Final effecting the claims has been filed or entered by the Examiner. Accordingly, all remaining claims stand in the same condition as they did at the time of the July 18, 2006 Final Office Action.

#### **V. SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention relates to an optical waveguide and an optical transmitting and receiving module which includes a common transmitting / receiving port at one end of the waveguide, and separate light emitting and light receiving ports at another end of the waveguide. As noted on page 2 of the specification, the prior art devices utilized a y-branching waveguide which limited the ability to simultaneously transmit and receive light within the same waveguide. Furthermore, as noted on pages 2 – 3 of the specification, other prior art devices required the use of light filters or other optical elements, and had disadvantages in terms of cost and productivity.

The object of the present invention is to provide an optical waveguide able to perform simultaneously a transmitting operation and a receiving operation free from any other optical elements, and a more efficient and low cost method of manufacturing such a device. Applicant's present invention overcomes the problems and deficiencies inherent in the prior art by providing a novel approach to overcoming the problems associated with the recognized waveguide structures.

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As noted in independent claim 1, an optical waveguide according to the present invention comprises (See Figures 1, 2, 3A, and 4A):

a first waveguide 21 having a common transmitting and receiving port 21a at one side and a receiving port 21b at the other side, extending linearly, and able to guide an optical signal in bi-direction (See page 7 of the disclosure), and

a second waveguide 22 branching off from said first waveguide 21 so as to make an acute angle  $\theta$  with said receiving port 21a (See pages 7 and 8 of the disclosure), coupling said first waveguide 21 at one side, having a transmitting port 22b at the other side, and guiding an optical signal to said first waveguide 21, wherein said second waveguide 22 is formed with a dimension such that said one side which is coupled to said first waveguide (pointed to by the lead line for reference number 22a in Figure 1) is smaller than the other side (pointed to by the lead line for reference number 22b in Figure 1).

As noted in independent claim 4, an optical transmitting and receiving module coupled with an optical fiber, a light emitting element and a light receiving element via an optical waveguide according to the present invention comprises (See Figures 1, 2, 3A, and 4A and page 7 of the disclosure):

a first waveguide 21 coupling said optical fiber 3 at one side and a light receiving element 4 at the other side and extending linearly, and a second waveguide 22 branching off from said first waveguide 21 so as to make an acute angle  $\theta$  with said other side of said first waveguide 21 (See pages 7 and 8 of the disclosure) and coupling said first waveguide 21 at one side and a light emitting element 5 at the other side, wherein said second waveguide 22 is formed with a dimension such that said one side which is coupled to said first waveguide

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(pointed to by the lead line for reference number 22a in Figure 1) is smaller than the other side (pointed to by the lead line for reference number 22b in Figure 1).

As noted in independent claim 7, an optical waveguide according to the present invention comprises (See Figures 1, 2, 3A, and 4A):

a first waveguide 21 having a common transmitting and receiving port 21a at one side and a receiving port 21b at the other side, extending linearly, and able to guide an optical signal in bi-direction (See page 7 of the disclosure), and

a second waveguide 22 branching off from said first waveguide 21 so as to make an acute angle  $\theta$  with said receiving port 21a (See pages 7 and 8 of the disclosure), coupling said first waveguide 21 at one side, having a transmitting port 22b at the other side, and guiding an optical signal to said first waveguide 21, wherein said second waveguide 22 is formed with a dimension such that said one side which is coupled to said first waveguide (pointed to by the lead line for reference number 22a in Figure 1) is smaller than the other side (pointed to by the lead line for reference number 22b in Figure 1) and the second waveguide is curved at a portion of adjacent the first waveguide (See page 9 of the specification).

As a result of the tapering of the second waveguide 22, light signal guided in the first waveguide 21 is prevented from entering the second waveguide core portion 22 (See the top of page 9 of the specification). Additionally, as a result of the use of an acute angle  $\theta$  between a first waveguide and a second waveguide, and is possible to improve the reception of light by the light receiving element 4, and to improve the transmission of light from the light emitting element 5 (See page 8 of the specification). Also, because of the use of a gentle curved shape of the second waveguide as shown in Figures 1 and 3A, the scatter of light in the waveguide is suppressed (See page 9 of the specification). Finally, due to the use

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of a curved second waveguide, it is possible to cheaply and efficiently place the light receiving element 4 and the light-emitting element 5 adjacent one another and facing identical directions.

The prior art fails to teach or suggest such a device as disclosed in any one of the above cited independent claims.

#### **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

- A. Whether the teachings of the *Fujita* (U.S. Patent No. 5,808,595) reference and the *Yasuda* (U.S. Patent No. 6,157,760) reference provides the requisite teaching or suggestion in order to render obvious claims 1, 2, 4, 5, and 7 under 35 U.S.C. §103(a).

#### **VII. ARGUMENT**

Applicant respectfully submits that the prior art reference of record, whether considered alone, or in combination, fails to teach or suggest Applicant's presently claimed invention. As detailed below, the rejection set forth by the Examiner is improper.

##### **A. The Cited References Fail to Obviate the Claimed Invention as specified in Claims 1, 2, 4, and 5.**

Applicants respectfully request reconsideration of the Examiner's rejection of claims 1, 2, 4, and 5 under 35 U.S.C. §103(a). The Examiner has rejected these claims in view of the cited prior art references of *Fujita* (U.S. Patent No. 5,808,595) and *Yasuda* (U.S. Patent No. 6,157,760).



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Claims 1 and 4 generally contain the following limitations (numbered for ease of reference):

1) a first waveguide having a common transmitting and receiving port at one side and a receiving port at the other side, extending linearly, and able to guide an optical signal in bi-direction, and

2) a second waveguide branching off from said first waveguide so as to make an acute angle with said receiving port, coupling said first waveguide at one side, having a transmitting port at the other side, and guiding an optical signal to said first waveguide,

3) wherein said second waveguide is formed with a dimension such that said one side which is coupled to said first waveguide is smaller than the other side.

Under § 2143 of the MPEP, in order to establish a prima facie case of obviousness, the Examiner must meet three basic criteria. "First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." *MPEP §2143 rev. 3* (August, 2005). Applicants assert that the Examiner has failed to establish a prima facie case of obviousness for at least the reasons that the prior art reference fails to teach or suggest all of the claim limitations, and that there is no suggestion or motivation in the references themselves or in the knowledge generally available to combine the references.

Neither the primary reference nor any secondary reference provides any indication that a second transmit-only waveguide branch should be connected to a first/common waveguide via a tapered end thereof. Applicants submit that the Examiner mis-characterizes the *Yasuda* reference on page 3 of the Office Action by stating that "*Yasuda* teaches a second

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(sending) waveguide (Figure 4, element 28) coupled to a first (receiving) waveguide (26) at an acute angle and tapered such that the side coupled to the first waveguide (the one side) is smaller than the side coupled to the transmitter (the other side) (pages 5 and 6, paragraph 89).” In contrast, Applicants submit that *Yasuda* teaches the direct connection of a first transmitting waveguide 28 to a light-emitting element 30 and to an optical fiber 29. *Yasuda* fails to teach or suggest wherein the second waveguide is coupled to the first waveguide, and certainly fails to teach or suggest wherein the tapered end of the second waveguide is attached to the first waveguide. *Fujita* fails to include any disclosure whatsoever regarding tapering of the main or secondary waveguides. Accordingly, neither reference anticipates the claim requirement that the tapered end-portion of the second waveguide 22 be connected to the first waveguide 21.

Furthermore, there is no motivation evident within the references to combine the waveguide directly connecting a light emitting device 30 with an optical fiber 29 as disclosed in *Yasuda* with the y-branching common transmitting / receiving waveguide disclosed in *Fujita*. More specifically, Applicants submit that *Yasuda* teaches away from any supposed combination of the references by requiring that the transmit waveguide 28 be disposed in an entirely separate layer 24 than the receiving waveguide 22 as shown in Fig. 5 of *Yasuda*, and by further requiring that the transmit waveguide 28 be directly connected with the optical fiber 29 as shown in Fig. 4 of *Yasuda*. Applicants note that the Court of Appeals for the Federal Circuit has held that “We have noted elsewhere, as a ‘useful general rule,’ that references that teach away cannot serve to create a prima facie case of obviousness.” *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1354 (Fed. Cir., 2001). In light of *Yasuda*’s disclosure regarding the separation of waveguides and the direct connection of the

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transmitting waveguide to the light-emitting element and the optical fiber in order to achieve 100% transmission characteristics. Applicants submit that the reference cannot serve to create a prima facie case of obviousness.

Accordingly, Applicants submit that claims 1, 2, 4, and 5 are allowable over the cited prior art, and respectfully request that the rejection be over-turned on appeal, and the remaining claims placed in condition for allowance.

**B. The Cited References Fail to Obviate the Claimed Invention as specified in Claim 7.**

Applicants respectfully request reconsideration of the Examiner's rejection of claim 7 under 35 U.S.C. §103(a). The Examiner has rejected these claims in view of the cited prior art references of *Fujita* (U.S. Patent No. 5,808,595) and *Yasuda* (U.S. Patent No. 6,157,760). Applicants incorporate all of the arguments as set forth above regarding the failure of the cited prior art to teach or suggest the formation of a first common transmitting and receiving waveguide and the attachment of a second waveguide at an acute angle and wherein a smaller tapered end of the second waveguide is attached to the first common waveguide. Applicants submit further that, counter to the argument set forth by the Examiner on pages 4 – 5 of the last Office Action, one of ordinary skill in the art, in light of the teachings of the prior art references, would not have incorporated the curved receiving waveguide feature of *Yasuda* into the straight transmitting waveguide of *Fujita*.

Under § 2143 of the MPEP, in order to establish a prima facie case of obviousness, the Examiner must meet three basic criteria. "First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one

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of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.” *MPEP* §2143 *rev. 3* (August, 2005). Applicants assert that the Examiner has failed to establish a *prima facie* case of obviousness for at least the reasons that the prior art reference fails to teach or suggest **all** of the claim limitations, and that there is no suggestion or motivation in the references themselves or in the knowledge generally available to combine the references.

Neither the primary reference nor any secondary reference, alone or in combination, discloses a curved transmit-only waveguide branch connected to a first/common waveguide via a tapered end thereof, the curvature functioning to reduce light scatter and decrease the costs of manufacture. Accordingly, neither reference anticipates the claim requirement that the tapered end-portion of the curved second waveguide 22 be connected to the first waveguide 21.

Additionally, even if it is considered that *Yasuda* teaches a curved receiving waveguide, Applicants submit that neither the primary reference nor any secondary reference, alone or in combination, teaches or suggests the application of the curved receiving waveguide to a transmit-only waveguide branch.

In the last Office Action, the Examiner stated that, in light of page 9, paragraph 128 of the *Yasuda* reference, “It would have been obvious to one of ordinary skill in the art at the time of the invention to modify *Fujita* with the curved waveguide of *Yasuda*. The motivation would have been to allow for greater distances between the waveguides without reducing efficiency.” (See page 5 of the last Office Action). Applicants respectfully disagree that one of ordinary skill in the art would have been motivated to combine the references in order to

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allow for greater distances between waveguides. Applicants submit that this modification is an artifact of the *Yasuda* device's placement of the two waveguides in separate layers 22 and 24 such that the overlap, as shown in Figure 24 of *Yasuda*. Such a motivation has no application to the y-branch structure of the currently claimed invention.

More specifically, as shown in Figures 1 and 10 of *Fujita*, the y-branch structure naturally creates distance between the secondary waveguide 4 and the common first waveguide 14. Accordingly, one of ordinary skill in the art would have not motivation to include the curvature disclosed in the *Yasuda* reference into the secondary-waveguide structure of *Fujita*.

Most importantly, none of the cited prior art references have discovered that the curvature of the secondary waveguide, coupled with a tapering of the secondary waveguide, substantially reduces reflections and light scattering in the dual transmitting/receiving waveguide structure. Furthermore, neither reference discloses the advantage shown in Figure 1 of utilizing a curved second waveguide wherein the light receiving element 4 and the light emitting element 5 can be placed close to each other on the substrate 1 and facing the same direction. Such a feature allows for the further reduction of feature size of the overall device, and improved efficiencies in manufacturing.

Accordingly, Applicants submit that claim 7 is allowable over the cited prior art, and respectfully request that the rejection be over-turned on appeal, and claim 7 placed in condition for allowance.

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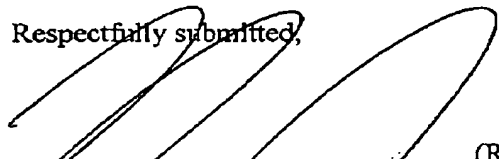
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**CONCLUSION**

In light of the foregoing, Applicant submits that the rejections of all claims are improper for the reasons noted and the rejections should all therefore be withdrawn.

Respectfully submitted,

Date: September 13, 2006

  
\_\_\_\_\_  
Robert J. Depke  
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Attorneys for Applicant

  
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**VIII. CLAIMS APPENDIX:**

This listing of claims reflects the current status of the claims as they stand as of the July 18, 2006 Final Office Action:

**1. (Rejected) An optical waveguide comprising:**

a first waveguide having a common transmitting and receiving port at one side and a receiving port at the other side, extending linearly, and able to guide an optical signal in bi-direction, and

a second waveguide branching off from said first waveguide so as to make an acute angle with said receiving port, coupling said first waveguide at one side, having a transmitting port at the other side, and guiding an optical signal to said first waveguide, wherein said second waveguide is formed with a dimension such that said one side which is coupled to said first waveguide is smaller than the other side.

**2. (Rejected) An optical waveguide as set forth in claim 1, wherein said first waveguide is formed with a dimension able to guide a plurality of modes of the optical signal.**

**3. (Cancelled)**

**4. (Rejected) An optical transmitting and receiving module coupled with an optical fiber, a light emitting element and a light receiving element via an optical waveguide comprising:**

a first waveguide coupling said optical fiber at one side and a light receiving element at the other side and extending linearly, and a second waveguide branching off from said first waveguide so as to make an acute angle with said other side of said first waveguide and coupling said first waveguide at one side and a light emitting element at the other side, wherein said second waveguide is formed with a dimension such that said one side which is coupled to said first waveguide is smaller than the other side.

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5. (Rejected) An optical transmitting and receiving module as set forth in claim 4, wherein said first waveguide is formed with a dimension able to guide a plurality of modes of said optical signal.

6. (Cancelled)

7. (Rejected) An optical waveguide comprising:

a first waveguide having a common transmitting and receiving port at one side and a receiving port at the other side, extending linearly, and able to guide an optical signal in bi-direction, and

a second waveguide branching off from said first waveguide so as to make an acute angle with said receiving port, coupling said first waveguide at one side, having a transmitting port at the other side, and guiding an optical signal to said first waveguide, wherein said second waveguide is formed with a dimension such that said one side which is coupled to said first waveguide is smaller than the other side and the second waveguide is curved at a portion of adjacent the first waveguide.



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**IX. EVIDENCE APPENDIX:**

None.

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**X. RELATED PROCEEDINGS APPENDIX:**

None.